



Emerging Stronger Taskforce's Alliance for Action on Robotics Pilots Two Autonomous Bus Services to Augment Existing Transport Network

- ***This pilot is Singapore's first deployment of an autonomous transport revenue service***
- ***Deployment is driven by industry participants, led by the Emerging Stronger Taskforce's Alliance for Action on Robotics***

The Launch of Singapore's First Autonomous Transport Revenue Service

1 COVID-19 has intensified the need for digital transformation and innovation, and created opportunities for innovative, transformative, and operationally ready solutions for Singapore's economy and businesses. Acting decisively to seize these opportunities, the Alliance for Action ("AfA") on Robotics¹ was convened by the Emerging Stronger Taskforce (EST)² to promote and accelerate sustainable deployment of robotics in Singapore.

2 Co-led by Vincent Chong, Group President and CEO of ST Engineering, and Peter Ho, CEO of HOPE Technik, the AfA rallied organisations across the value chain – bus transport operators (SBS Transit, SMRT), and technology providers (ST Engineering, GPS Lands, SWAT Mobility) – to develop and drive sustainable autonomous vehicle (AV) solutions. This collaborative approach allowed the AfA to harness the capabilities across the mobility value chain that each partner brings to the AfA, and collectively test and evaluate the potential for venturing into new businesses for the fast-growing AV space globally.

3 From 25 January 2021, the AfA, supported by CapitaLand and JTC, will deploy on-demand autonomous bus services at Singapore Science Park 2 and Jurong Island. This marks the first time autonomous buses are operating a revenue service in Singapore, bringing local AV services and solutions one step closer towards commercialisation, domestically and abroad. The pilot is expected to end on 30 April 2021, following which, the AfA will evaluate the findings before ascertaining next steps.

¹ Convened under the EST, the AfAs are industry-led coalitions working in close partnership with Government, to act on key growth opportunities for Singapore. Each AfA adopts a 'start-up' approach while working collaboratively with both industry and government partners. These AfAs explore, prototype, and implement ideas over a three-month sprint, and represent a new way forward for collaboration between the private and public sectors.

² The EST was formed under the Future Economy Council (FEC) to review how Singapore can stay economically resilient and build new sources of dynamism to emerge stronger from COVID-19. The EST is co-chaired by Minister for National Development and Minister-in-charge of Social Services Integration, Mr Desmond Lee, and Group CEO of PSA International and Chairman of JTC, Mr Tan Chong Meng.



4 Through this pilot, the AfA aims to establish a track record which demonstrates services that meet commuters' need for safe, reliable, and efficient modes of transportation. In order to gain more data and insights that will be valuable to the development of future urban mobility services, the two routes differ in physical conditions, commuter and partner mix, service and vehicle type, as well as operation concepts. Please refer to Annexes B and C for more details of the routes.

5 Facilitated by the Singapore Economic Development Board (EDB) and the Land Transport Authority (LTA), the pilot will enable the partners to further develop and refine their capabilities, expertise, and service delivery, thus strengthening the local AV ecosystem. This is in line with the AfA's vision of developing global champions in robotics, and to position Singapore as a leading global operator and provider of end-to-end systems for autonomous transport in cities which are looking to implement sustainable, urban transport solutions. The AfA has, in parallel, also been working with the trade unions to create relevant training and upskilling pathways for bus captains who will then be able to take on better jobs, such as managing commuter experience and overseeing the autonomous bus management system.

6 "We are happy that Singapore companies across different industries are stepping forward together to deliver an innovative and pioneering pilot in autonomous bus services, one that solves real unmet demand in the piloted locales," notes Mr Tan Chong Meng, Co-Chair of the EST, and Chairman, JTC Corporation. "With the support of bus transport operators, transport workers like bus captains have acquired new skills and provided valuable input to the project. As confidence is built, further deployments can be hosted in JTC's estates across Singapore to foster more collaboration opportunities, strengthen the ecosystem, and speed up the move towards autonomous mobility."

7 "The AfA aims to operationalise autonomous transport successfully by creating strong and complementary partnerships that leverage the domain expertise of the partners," says Mr Vincent Chong. "It is heartening to see the collaboration of large local enterprises including local bus transport operators, SMEs, and start-ups to form one business ecosystem to develop the autonomous transport industry in Singapore. Collectively, we will offer more sustainable, integrated public transport services, and build a track record that will position us well for overseas markets."

8 "The AfA not only supports the Smart Nation initiatives but will also build up Singapore's reputation as a leading global operator and provider of end-to-end systems for autonomous transport for cities looking to implement sustainable, urban transport solutions. We also fulfill our passion of improving lives through robotics and autonomous technology," says Mr Peter Ho.

9 "LTA has been working with our industry partners to deepen Singapore's expertise in AVs and enable their safe deployment on our public roads. The AfA's limited deployments of AV bus services with onboard safety drivers at Singapore Science Park 2 and Jurong Island are another key step in building up local capabilities in this emerging field," notes Mr Ng Lang, CEO, LTA.



10 “Over the last few years, the National Transport Workers’ Union (NTWU) has been working closely with LTA and our industry partners to prepare transport workers for the introduction of AV technology into the transport systems. When AV was first introduced in Singapore, our union leaders and workers were worried about their jobs and livelihoods. Through many visits to trial sites, our union leaders have also seen for themselves how the technology will help uplift the sector as a whole, which will lead to better work prospects for our workers,” says Mr Melvin Yong, Executive Secretary, NTWU. “To help our transport workers familiarise themselves with AV, the union pushed for experienced bus captains to be deployed as AV operators for the various trials. I’m glad that our bus captains have given positive feedback on their AV experiences thus far. The union will continue to work with our tripartite partners to educate our transport workers on AV technology, encourage and facilitate upskilling so as to enable them to take on new roles when we eventually move to an autonomous environment.”

Ongoing Efforts for AV Development in Singapore

11 Singapore has been facilitating various on-road AV trials since 2015. This pilot comes after the successful public trial on Sentosa which ST Engineering conducted in partnership with the Ministry of Transport and Sentosa Development Corporation in 2019. It ran consistently over three months without any incidents and ferried about 6,000 members of the public free of charge, nearly all of whom gave high satisfaction scores.

12 In 2017, the *Singapore Autonomous Vehicles Consortium* was launched to facilitate and strengthen collaboration between the AV industry and the Government to further accelerate the development, application and adoption of AV technologies in Singapore. The consortium comprises ST Engineering and educational and research institutes including A*STAR’s Institute for Infocomm Research, National University of Singapore (NUS)’s Faculty of Engineering, Singapore University of Technology & Design (SUTD), Nanyang Technological University (NTU) through the ST Engineering-NTU Corporate Lab.

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**Annex A – Quotes from Members of the AV Ecosystem
Annex B – Route Information of AV Deployment at Singapore Science Park 2
Annex C – Route Information of AV Deployment at Jurong Island**





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Annex A – Quotes from Members of the AV Ecosystem

SMRT is pleased to be part of a Singapore team delivering autonomous and innovative transport solutions to commuters. Our project team and bus captains are excited by the new learning opportunities, as well as prospects in a nascent industry. This will bolster the employability of our bus captains and help develop relevant talent in the transport industry.

Mr Neo Kian Hong
Group CEO, SMRT Corporation

We are excited to be a part of this pilot to run on-demand autonomous bus services in Jurong Island which is a new milestone not just for us, but for Singapore's public transport sector. Importantly, this pilot will pave the way forward in preparing for the future by upskilling our bus workforce, in particular, our bus captains, helping them stay relevant. In fact, our involvement in operating these vehicles over the past two years on a trial basis has also provided us with valuable insights in training our bus captains to serve as safety operators on board. Leveraging technology will also enable us to provide better service to our passengers.

Mr Cheng Siak Kian
Acting Chief Executive Officer, SBS Transit

High Definition (HD) Maps facilitates the critical functions of localisation and perception aspects. These functions enhance the drive and navigational experiences impacting the safety aspects of these AVs. GPS Lands contributed the HD Maps for both deployed sites. We are glad to be a part of Team Singapore and contributing to an end-to-end AV solutions offering overseas.

Gerry Ong
Founder, GPS Lands

SWAT Mobility is proud to be part of the local AV ecosystem, collaborating with esteemed partners to iron out technological complexities and establish reliable processes that would facilitate the operationalisation of AV transport. This experience has enabled us to expand our capacity and degree of integration with AV management systems, as we explore integrations with our fleet management and route optimisation functions. In this pilot, we provide the customer-facing app with booking and payments capability. We hope the service morphs into a mobility on demand service in the future, where our demand aggregation capabilities are equipped to support it.

The success of the pilot would accelerate the move towards running public AV transport and the delivery of safe and affordable AV deployments commercially at scale. We believe in using our technology to develop smart autonomous transport solutions that can make urban transport more efficient and sustainable for everyone.

Jarrold Ong
CEO of SWAT Mobility Pte. Ltd.





This deployment enables commuters to get from point A to B effectively and seamlessly using Zipster, a mobile application, to plan their trip, book, and pay for the AV services. This is a Mobility-as-a-Service through a revenue-generating autonomous transport service in Singapore.

Mr Lim Wee Meng
CEO, mobilityX, a subsidiary of SMRT

CapitaLand is delighted to be a partner in the deployment of autonomous buses at our Singapore Science Park 2, which is in line with our objective to be a smart, sustainable and community-oriented developer. To ensure that CapitaLand remains at the forefront of technology developments, we have been implementing innovative solutions at our properties to enhance safety, sustainability and customer experience. The CapitaLand-led Smart Urban Co-Innovation Lab, which opened in Singapore Science Park 2 in October 2020, has partnered with 30 industry players to co-create and testbed smart cities solutions. We look forward to more partnerships that bring great ideas to life and strengthen CapitaLand's position as a leading real estate company.

Mr Manohar Khiatani
Senior Executive Director, CapitaLand Group

It is our belief that the real value of "Autonomous Transport" will be derived from a fully integrated, dynamically interactive, multi-layered connected service utility model; with public transport serving as the backbone where one could "mix and match" several modes to achieve seamless point-to-point autonomous travel. The benchmark criterion being: availability, affordability, efficiency, convenience, safety, and sustainability.

The AfA initiative, as a catalyst for collaboration between public and private sectors, facilitates the convergences of the vital elements necessary to make a complex undertaking of this magnitude possible. An autonomous public transport system will provide our nation with unprecedented service and cost efficacies for what should essentially become a birth right. An implementation of this scale, at the forefront of technology backed by the Singapore Inc. brand, will provide the AfA partners tremendous export opportunities.

Mr Michael Deeb
CEO, DSC Corporation

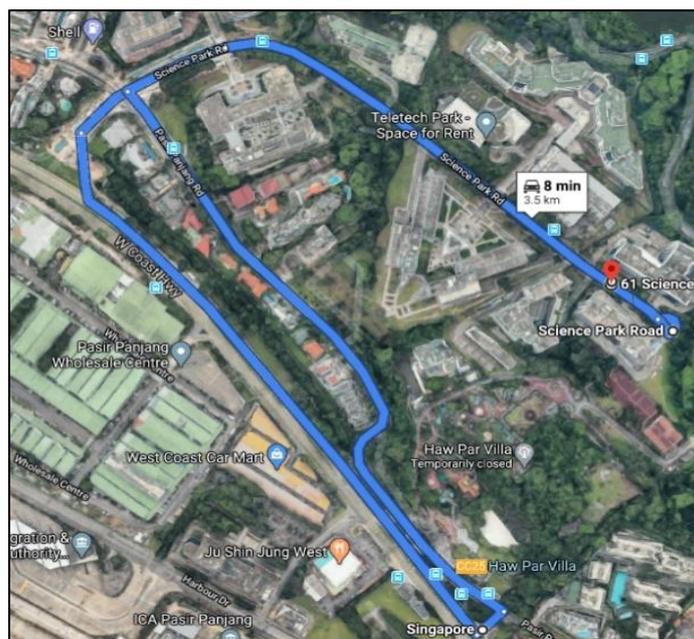


Annex B – Route Information of AV Deployment at Singapore Science Park 2

The autonomous bus service aims to explore if an on-demand service is better able to meet the transport needs of tenants during the off-peak hours, when frequency of public transport is reduced.

The service will provide greater convenience and flexibility for members of the public travelling from Singapore Science Park 2 to the nearest main transport node Haw Par Villa MRT station during off-peak hours. Members of the public can book an autonomous bus on-demand via the mobile app, Zipster, shortening waiting times (30-minute intervals) during off-peak hours.

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- Route:** Haw Par Villa MRT Station to The Galen at Singapore Science Park 2
- Operating Hours:** Weekdays (excluding public holidays), 10am – 5pm
- Deployment Period:** 25 January 2021 – 30 April 2021
- Bus type / Capacity:** Minibus (7m) / 10 seated with no standing passengers
- Booking / Payment:** Zipster
- Ecosystem Partners:** ST Engineering – Programme Lead, AV and Management systems
SMRT – Operations
GPS Lands - Mapping
mobilityX (subsidiary of SMRT) – Booking / Payment app



Annex C – Route Information of AV Deployment at Jurong Island

The autonomous bus service provides Jurong Island employees a fixed schedule transport around Sakra Loop during lunch hours for them to access the amenity centre Oasis @ SAKRA. It complements the existing on-demand bus service available on Jurong Island during lunch hours.

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- Route:** 10 bus stops around Sakra Loop on Jurong Island
- Operating Hours:** Weekdays (excluding public holidays), 11.30am – 2.30pm
- Deployment Period:** 25 January 2021 – 30 April 2021
- Bus type / Capacity:** City bus (12m) / 26 seated with no standing passengers
- Booking / Payment:** SWATRide
- Ecosystem Partners:** ST Engineering – Programme Lead, AV and Management systems
SBST – Operations
GPS Lands - Mapping
SWAT Mobility – Booking / Payment app

